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Mortuary statistics for week ended July 4, 1900.

Bronchitis	6	Congestion of lungs	0
Congestion of brain	3	Meningitis	16
Enteritis	18	Malaria	3
Yellow fever	5	Sclerosis, arterial	10
Pernicious malarial fever	3	Tuberculosis	12
Valvular disease of heart	4	Deaths from all causes	137
Fatty degeneration of heart	6		

Yellow-fever mortality in Havana, 1884-1900—Statistics and deductions.

[By Surg. H. R. Carter, United States Marine-Hospital Service, chief quarantine officer of Cuba, submitted July 9, 1900.]

Since the beginning of 1884 the mortuary statistics of this city have been kept in this office. These were kept for the purpose of keeping informed of the prevalence of epidemic diseases, yellow fever and smallpox, but have extended of late years to include a number of others, and total mortality as well.

A clerk was sent each week to the Colon and Baptist cemeteries to copy the records of burial for yellow fever and smallpox for that week, the record being made for each day's burials. For yellow fever and smallpox, the place, as well as day of death, is always specified, which not only enabled us to tell in what part of the city the disease was most prevalent, but is a very considerable check on our collector of statistics as having to specify each place, street, and number, he would be little apt to make an erroneous record either of omission or commission.

There are 3 other cemeteries in the municipality of Havana besides the two mentioned: Calvario, Arroyo Naranja, and the Chinese. Of these, however, the last only has relation to the city of Havana as a port, the villages for which these cemeteries are used being 9 kilometers distant from Havana proper. They also add nothing to the reported yellow-fever mortality. The population contributory to the Chinese cemetery is in this city, and its omission lessens our total death rate (by from 4 to 10 per month in normal years and from 30 to 80 during the reconcentration) from what is proper for the city. Its omission is, however, without effect on the yellow-fever statistics, as an examination of its records (by Major Gorgas) shows but a single burial there of which the death is assigned to that cause from 1890 to 1898 inclusive.

The statistics above referred to as obtained from the cemeteries are especially those of the civilian population. The records of the deaths at the military hospitals (including both soldiers and sailors) were also thus obtained until 1895. After that we received daily reports from these hospitals, duplicates of those furnished the captain-general, giving the number of patients on hand, admitted, discharged, died, and remaining. These were received from an unofficial (but reliable) source up to the beginning of the war.

These military statistics are regarded as accurate, although, as will be seen, but little importance is attached to them.

The total mortality is simply the total number buried in the Colon and the Baptist cemeteries, and although slightly less (by the burials in the Chinese cemetery) than it should be, is *proportionally* correct, and shows the increase or fall of mortality correctly, and is given so that a comparison of the general mortality with that from yellow fever may be made.

So far as yellow fever is concerned, these statistics agree very closely with those which Major Gorgas, the chief sanitary inspector, has col-

lected for that disease from 1891 to 1898 inclusive, from the records of the judges, to whom the deaths are first certified by the attending physicians, with one difference which will be noted later.

Naturally this agreement by months is not absolute. Deaths are frequently reported by the physician the last day of the month and burials take place the first day of the next month. Some die in town who are buried elsewhere and we miss those who die in cloister. By months, then, the statistics are not the same, but the agreement for any two months is extremely close. They are believed, then, to be fairly correct—for infectious diseases, nearly absolutely so.

Except the statistics in Chaillé's report of 1880, a work which in its design is perfection itself, all the statistics which I have seen on the yellow fever mortality of Havana make no difference between those from the military and those from the civilian population. Taken together, to my mind, these teach little of what we want to know, the *normal course* of yellow fever in Havana in the past, how its prevalence was affected by season, meteorology, etc., and are absolutely valueless for any comparison with the present and future from which the military element has been, and doubtless will be, eliminated.

An observation of the military statistics shows frequently enormous waves of yellow fever among them, with no corresponding increase or even a decrease in the civilian deaths, due to arrival of, and occupation of infected quarters by, large numbers of nonimmune soldiers. To have any conception of the normal course of yellow fever in Havana, and especially to have any fair comparison of the past with the present and future, we must confine ourselves to the statistics of the civilian population, although it is fair to say that the removal of the military population is in itself a factor, of what value I can form no estimate, in the formation of new foci of infection, and hence the propagation of diseases among civilians.

Our method of recording the place of death enables us to separate these 2 classes. It will be found, then, that we record deaths in private residences, in private hospitals, and in military hospitals. I have counted the first 2 as civilian deaths, the last as military and naval. This is not quite true, as will be explained later.

A word as to the private hospitals or "quintas" of Havana. The immigration to Havana which remains in the city is practically confined to Spaniards. These on arrival join certain mutual benefit societies, the Centro Gallego; the Centro Asturiano and the Centro de Dependientes being at present the principal ones; the latter has at present something over 12,000 members. This practice is practically universal for the newly arrived Spaniard. These societies furnish hospital treatment for their contributors when sick and a very large proportion, I should say 90 per cent, of the well marked cases of yellow fever among these men are treated in these hospitals. I would say here that the Spanish immigration is mainly confined to men; women and children but seldom coming, and having no domicile, properly so called, they are the more ready to go to hospitals when seriously sick. These "quintas" are much esteemed for the treatment of yellow fever, and not a few who are not members of the societies go to them as pay patients.

I have said that my division in which I include all who were treated at residences or private hospitals as being civilians is not entirely correct. I am informed by Havana physicians that a considerable number of Spanish officers were treated at their homes and a less number in

these "quintas." My enumeration of deaths among civilians, then, will be somewhat too high, and among soldiers somewhat too low.

Thus, for the year ended March 31, 1894, I give 17 more deaths in "residences and private hospitals" than Major Gorgas does of "civilians," while he has 14 more of "militares" than I have in the "military hospitals"—our totals for the year differing by only 3. This can only mean that a certain number, between 14 and 17, of "militares" were treated at their residences or in private "quintas" during that year. So for such other years as I am enabled to compare our statistics, I have a few more in my "residences and civil hospitals" than Gorgas has "civilians," balanced or nearly balanced by having fewer in the "military hospitals" than he has "militares," our totals agreeing very closely. In 1893 I have 11 more in my "residences and civil hospitals" than he has "civilians," and 13 fewer in "military hospitals" than he has soldiers, our totals differing by 2; for the two years only by 1.

Also in 1896 and 1897 a certain number of petty officers were treated in the quinta dependientes, and some of the deaths in this institution recorded by me as from "private hospitals" are those of military men. As said before, then my enumeration of deaths of civilians is somewhat too high and that of soldiers is to the same extent too low, but the difference from the truth is slight.

There is also another factor to be considered in the military statistics. The heirs of a soldier dying of yellow fever receive a higher pension than one of ordinary disease, and it is alleged that the balance of doubt among the Spanish military surgeons was always thrown in favor of the yellow fever diagnosis. I believe this to be true, at least I have heard it from Cuban physicians and others in a position to know wherever I have been in the island. Neither of these factors will be great enough, however, to affect the lesson of these statistics.

The mortality of the tables for 1897 and 1898 in the military hospitals is not derived exclusively from our own records. The reason is this: The mortality in the military hospitals from yellow fever had become so great that from November, 1896, the Santa Catalina warehouses in Regla, which had hitherto been used simply for a convalescent hospital, were now used to a considerable extent for a hospital for yellow fever from the Havana garrison. The statistics from this hospital were at first given to this office with those of the other military hospitals, but about August, 1897, they ceased to be furnished, although they properly belonged to the Havana garrison.

Our own records, then, are amended by the addition of the statistics derived from the records of the judges of first instruction of Regla, which I owe to the kindness of Major Gorgas.

1843

July 20, 1900

TABLE I.
1884 TO 1885.

Month.	Residence and civil hospital.			Military hospital.	Total deaths from—	
	Resi- dence.	Civil hospital.	Total.		Yellow fever.	All causes.
April.....	4	12	16	18	34	490
May.....	10	20	30	27	57	566
June.....	9	28	37	31	68	599
July.....	17	56	73	58	131	730
August.....	22	44	66	36	102	635
September.....	6	21	27	15	42	503
October.....	4	13	17	7	24	549
November.....	2	7	9	0	9	576
December.....	2	1	3	3	6	490
January.....	0	3	3	3	6	490
February.....	0	1	1	2	3	427
March.....	0	1	1	1	2	458
Total.....	76	207	283	201	474	6,513

1885 TO 1886.

April.....	0	0	0	2	2	481
May.....	0	0	0	4	4	492
June.....	0	2	2	2	4	518
July.....	2	1	3	12	15	576
August.....	4	7	11	23	34	500
September.....	9	10	19	16	35	469
October.....	10	30	40	3	43	490
November.....	7	16	23	0	23	487
December.....	5	1	6	1	7	497
January.....	2	2	4	0	4	475
February.....	0	2	2	1	3	429
March.....	1	0	1	1	2	523
Total.....	40	71	111	65	176	5,935

1886 TO 1887.

April.....	1	1	2	0	2	536
May.....	1	1	2	0	2	499
June.....	3	10	13	1	14	506
July.....	9	21	30	4	34	516
August.....	8	24	32	9	41	557
September.....	3	19	22	17	39	526
October.....	3	9	12	5	17	471
November.....	5	3	8	6	14	439
December.....	2	4	6	3	9	480
January.....	1	2	3	3	6	490
February.....	0	4	4	2	6	416
March.....	0	4	4	4	8	540
Total..	36	102	138	54	192	5,976

1887 TO 1888.

April.....	4	6	10	11	21	549
May.....	10	24	34	48	82	645
June.....	12	23	35	94	129	672
July.....	11	40	51	53	104	843
August.....	12	30	42	32	74	840
September.....	6	11	17	24	41	802
October.....	7	16	23	12	35	792
November.....	4	11	15	9	24	658
December.....	0	7	7	8	15	712
January.....	1	3	4	5	9	765
February.....	0	2	2	5	7	608
March.....	2	2	4	10	14	567
Total.....	69	175	244	311	555	8,453

July 20, 1900

1844

1888 TO 1889.

Month.	Residence and civil hospital.			Military hospital.	Total deaths from—	
	Resi- dence.	Civil hospital.	Total.		Yellow fever.	All causes.
April	2	2	4	20	24	474
May	1	4	5	22	27	451
June	1	7	8	30	38	498
July	5	19	24	55	79	586
August	4	48	52	64	116	639
September	6	12	18	45	63	522
October	15	15	30	18	48	468
November	6	15	21	17	38	539
December	5	17	22	4	26	577
January	7	23	30	4	34	511
February	3	6	9	3	12	426
March	5	12	17	2	19	515
Total	60	180	240	284	524	6,206

1889 TO 1890.

April	5	1	6	6	12	505
May	3	8	11	8	19	506
June	7	19	26	23	49	550
July	8	30	38	25	63	583
August	14	39	53	31	84	557
September	6	30	36	11	47	527
October	5	16	21	5	26	452
November	9	13	22	6	28	471
December	3	7	10	5	15	454
January	2	7	9	2	11	481
February	0	2	2	2	4	459
March	0	1	1	3	4	556
Total	62	173	235	127	364	6,101

1890 TO 1891.

April	0	4	4	8	12	535
May	1	10	11	15	26	694
June	2	10	12	33	45	826
July	10	21	31	36	67	863
August	7	21	28	36	64	651
September	3	17	20	11	31	627
October	5	17	22	10	32	704
November	8	8	16	7	23	547
December	5	5	10	2	12	547
January	1	4	5	6	11	602
February	2	1	3	1	4	560
March	0	1	1	3	4	560
Total	44	119	163	168	331	7,716

1891 TO 1892.

April	1	3	4	1	5	613
May	0	4	4	3	7	590
June	2	14	16	27	48	600
July	5	8	13	52	65	624
August	11	12	23	44	67	614
September	6	20	26	35	61	546
October	8	15	23	26	49	550
November	2	14	16	10	26	570
December	2	8	10	7	17	701
January	1	5	6	9	15	636
February	3	3	6	4	10	517
March	0	0	0	1	1	553
Total	41	106	147	219	366	7,114

1892 TO 1893.

Month.	Residence and civil hospital.			Military hospital.	Total deaths from—	
	Resi- dence.	Civil hospital.	Total.		Yellow fever.	All causes.
April.....	2	3	5	3	8	588
May.....	0	6	6	1	7	629
June.....	4	6	10	3	13	646
July.....	4	15	19	9	28	581
August.....	12	40	52	17	69	673
September.....	16	42	58	16	74	581
October.....	6	29	35	18	53	578
November.....	11	26	37	16	53	640
December.....	7	26	33	3	36	583
January.....	0	15	15	2	17	608
February.....	3	4	7	0	7	447
March.....	0	3	3	2	5	524
Total.....	65	215	280	90	370	7, 078

1893 TO 1894.

April.....	0	4	4	4	8	547
May.....	2	2	4	20	24	586
June.....	12	47	59	15	74	640
July.....	21	70	91	32	123	693
August.....	12	70	82	17	99	585
September.....	12	47	59	11	70	561
October.....	9	28	37	10	47	564
November.....	9	20	29	4	33	480
December.....	1	7	8	3	11	534
January.....	1	4	5	3	8	499
February.....	0	0	0	4	4	470
March.....	0	1	1	1	2	521
Total.....	79	300	379	124	503	6, 680

1894 TO 1895.

April.....	1	3	4	1	5	498
May.....	0	0	0	17	17	585
June.....	3	2	5	28	33	457
July.....	5	6	11	62	73	703
August.....	5	16	21	42	63	687
September.....	12	25	37	31	68	561
October.....	8	21	29	11	40	515
November.....	3	12	15	3	18	564
December.....	6	15	21	6	27	658
January.....	2	7	9	4	13	590
February.....	0	3	3	1	4	549
March.....	1	0	1	1	2	500
Total.....	46	110	156	207	363	6, 817

1895 TO 1896.

April.....	2	3	5	1	6	575
May.....	5	5	10	0	10	594
June.....	5	7	12	2	14	663
July.....	17	62	79	7	86	704
August.....	15	70	85	37	122	676
September.....	20	71	91	38	129	650
October.....	18	50	68	38	106	593
November.....	8	15	23	13	36	494
December.....	2	5	7	15	22	450
January.....	1	3	4	6	10	534
February.....	0	0	0	9	9	545
March.....	0	0	0	5	5	644
Total.....	93	291	384	171	555	7, 122

July 20, 1900

1846

1896 TO 1897.

Month.	Residence and civil hospital.			Military hospital.	Total deaths from—	
	Resi- dence.	Civil hospital.	Total.		Yellow fever.	All causes.
April.....	1	0	1	12	13	698
May.....	1	2	3	27	30	787
June.....	4	0	4	45	49	880
July.....	10	8	18	99	117	1,062
August.....	15	22	37	227	264	1,222
September.....	10	15	25	153	178	1,034
October.....	7	13	20	241	261	1,182
November.....	5	14	19	350	369	1,365
December.....	5	3	8	214	222	1,369
January.....	0	0	0	149	149	1,514
February.....	1	0	1	39	40	1,391
March.....	5	0	5	23	28	1,339
Total.....	64	77	141	1,579	1,720	13,843

1897 TO 1898.

April.....	5	1	6	66	72	1,058
May.....	4	0	4	90	94	1,014
June.....	0	5	5	170	175	1,036
July.....	6	4	10	191	201	1,183
August.....	3	6	9	196	205	1,523
September.....	6	3	9	168	177	1,536
October.....	2	6	8	92	100	1,956
November.....	2	2	4	76	80	1,998
December.....	1	2	3	17	20	1,874
January.....	0	3	3	10	13	1,775
February.....	0	0	0	2	2	1,587
March.....	0	0	0	5	5	1,456
Total.....	29	32	61	1,083	1,144	17,996

1898 TO 1899.

April.....	0	0	0	2	2	1,315
May.....	0	0	0	5	5	1,272
June.....	0	1	1	18	19	1,143
July.....	0	0	0	62	62	1,406
August.....	5	0	5	68	73	1,779
September.....	3	2	5	65	70	1,685
October.....	5	0	5	63	68	2,481
November.....	6	0	6	33	39	1,983
December.....	3	2	5	16	21	1,780
January.....	1	1	2	1	3	1,205
February.....	1	0	1	0	1	797
March.....	0	1	1	0	1	788
Total.....	24	7	31	333	364	17,634

1899 TO 1900.

April.....	2	0	2	0	2	612
May.....	0	0	0	0	0	629
June.....	0	0	0	1	1	629
July.....	2	1	3	0	3	660
August.....	2	6	8	4	12	613
September.....	6	7	13	6	19	488
October.....	13	12	25	0	25	486
November.....	9	7	16	0	16	486
December.....	13	10	23	0	23	508
January.....	3	5	8	0	8	478
February.....	3	6	9	0	9	472
March.....	1	3	4	0	4	569
Total.....	54	57	111	11	122	6,630

TABLE II.

Mortality from residences and civil hospitals, ten normal years, Havana, Cuba.

Month.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	Total.	Average.
April	0	2	10	4	6	4	4	5	4	4	43	4.3
May	0	2	34	5	11	11	4	6	4	0	43	4.3
June	2	13	35	8	26	12	16	10	59	5	186	18.6
July	3	30	51	24	38	31	13	19	91	11	341	34.1
August	11	32	42	52	53	28	23	52	82	21	396	39.6
September	19	22	17	18	36	20	26	58	59	37	372	37.2
October	40	12	23	30	21	22	23	35	37	29	272	27.2
November	23	8	15	21	22	16	16	37	29	15	202	20.2
December	6	6	7	22	10	10	10	33	8	21	133	13.3
January	4	3	4	30	9	5	6	15	5	9	90	9.
February	2	4	2	9	2	3	6	7	0	3	38	3.8
March	1	4	4	17	1	1	0	3	1	1	33	3.3
Total ..	111	138	244	240	235	163	147	280	379	156	.....	.....

Average per annum, 210.9.

TABLE III.

Mortality from military hospitals, ten normal years, Havana, Cuba.

Month.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	Total	Average.
April	2	0	11	20	6	8	1	3	4	1	56	5.6
May	4	0	48	22	8	15	3	1	20	17	138	13.8
June	2	1	94	30	23	33	27	3	15	28	256	25.6
July	12	4	53	55	25	36	32	9	32	62	340	34.0
August	23	9	32	64	31	36	44	17	17	42	321	32.1
September	16	17	24	45	11	11	35	16	11	31	217	21.7
October	3	5	12	18	5	10	26	18	10	11	118	11.8
November	0	6	9	17	6	7	10	16	4	3	77	7.7
December	1	3	8	4	5	2	7	3	3	6	42	4.2
January	0	3	5	4	2	6	9	2	3	4	34	3.8
February	1	2	5	3	2	1	4	0	4	1	23	2.3
March	1	4	10	2	3	3	1	2	1	1	28	2.8
Total	65	54	311	284	127	168	219	90	124	207	.....	.....

It seems unnecessary to strike a yearly average of this table, as owing to the variation in the number of men exposed to infection from which these statistics are derived an average can scarcely be said to exist. The months show different ratios from the civilian figures, to which, I think, but little significance can be attached. For our purposes this table is of little value.

TABLE IV.

Mortality from residences and civil hospitals, Havana, Cuba.

Month.	Abnormal years.					Month.	Abnormal years.				
	1895.	1896.	1897.	1898.	1899.		1895.	1896.	1897.	1898.	1899.
April	5	1	6	0	2	November	23	19	4	5	16
May	10	3	4	0	0	December	7	8	3	5	23
June	12	4	5	1	0	January	4	0	3	2	8
July	79	18	10	0	3	February	0	1	0	1	9
August	85	37	9	5	8	March	0	5	0	1	4
September	91	25	9	5	13	Total	384	141	61	31	111
October	68	20	8	6	25						

No average is allowable here.

TABLE V.

Mortality from military hospitals, Havana, Cuba.

Month.	Abnormal years.					Month.	Abnormal years.				
	1895.	1896.	1897.	1898.	1899.		1895.	1896.	1897.	1898.	1899.
April	1	12	66	3	0	November	13	350	76	33	0
May	0	27	90	5	0	December	15	214	17	16	0
June	2	45	170	18	1	January	6	149	10	1	0
July	7	99	191	62	0	February	9	39	2	0	0
August	37	277	196	60	4	March	5	23	5	0	0
September	38	153	168	65	6	Total	373	1,579	1,083	334	11
October	38	241	92	63	0						

No average is allowable here.

It will be noted that the division is made by periods of twelve months other than the calendar years. This is because the increase and decline of yellow fever does not coincide with the beginning and termination of the calendar years. Apparently the influence of the summer epidemic extends through the first trimester of the next year, and in April (March, April, or May) begins the increase for the ensuing summer.

This can be best seen by an inspection of Table II, where for the civil population the average number of deaths per month, taking the last ten normal years, 1885 to 1894, is given. It is seen that March is the lowest, with February, April, and May nearly the same. Examining the table in detail, it will be seen that any one of these four months may be the lowest, giving no deaths in certain years; that the increase of fever seems to begin in April, reaches its maximum in August and September, and slowly declines to a minimum, usually in March. This division, then, including the first trimester of the calendar year in the preceding year for yellow fever, seems to be justified by this table.

The mortality for January and February is evidently affected by the amount of fever in the preceding year—a "hold over" in fact (*a*).

It will also be noted that from January to May, inclusive, are the months giving the least yellow fever, December and June having very nearly the same mortality; hence conveying the same risk.

The belief that seems prevalent among Americans, then, that it is safe to come to Havana in November and perfectly safe in December, but that they must leave with the early summer, is absolutely without basis. May will average safer than January. In not a few years June is safer than December, and it is fair to class from June to December, inclusive, as a period of danger and from January to May, inclusive, as comparatively safe, January being the most dangerous month of this division of the year.

It also seems right to consider the period prior to 1895 separate from that following. The large mass of soldiers brought over at irregular intervals consequent on the war, with the diminution, almost cessation, of Spanish immigration from the early part or middle of 1896, must affect the mortality of the two different classes in diametrically opposite ways and bend each one from its own normal—if the military can be said to have a normal. I have therefore grouped the ten years pre-

a I felt that this division of the year for yellow fever had received the strongest possible indorsement when I found that Dr. Carlos Finlay had for the same reason made the same division, holding that "the epidemic year usually ends with March." I frankly acknowledge Dr. Finlay's priority in this, although my statistics were tabulated before I saw his.

ceding 1895 to themselves, and from them we are most apt to get information as to the normal course of the yellow fever among the civilian population of Havana. The years from 1895 to 1900, however, are not without their lesson.

In looking over Table I, the first thing that strikes the observer is the lack of the relationship between the civilian and military mortality. Thus, in 1891 they were 219 and 147 respectively, while in 1893 they were 124 and 379, the proportions being reversed. It is for this reason, I believe, that no conclusion from mixed military and civilian statistics as to the course of the disease among the civilian population can be drawn. If the period of the war were taken the discrepancies are more marked, 1897 giving 61 and 1,083 for civilian and military mortalities respectively. Unquestionably a prime factor in the mortality among soldiers was the bringing in of masses of new troops, nonimmunes, and quartering them in barracks virulently infected.

What, however, most impressed the writer when he first compiled these figures was the small number of deaths among the civilian population, 210.4 per annum being the average for the ten normal years preceding 1895 and 195 per annum for the last seventeen years. We must note, too, that these figures for civilian deaths are somewhat too high, including as they do a few soldiers.

During this time, then, seventeen years, there has never been any death rate among the civilian population even approaching to the epidemics of our own country—compare with 7,800+ deaths in New Orleans in 1853. Yellow fever for seventeen years has not been a marked factor in the civil mortality per annum in Havana.

Since yellow fever among the native Cuban population is not recorded it is obvious that the Spanish immigrants, practically the only immigrants to the island, has furnished the yellow fever mortality. A knowledge of this movement then is necessary to interpret the statistics even from the civil population. We should know (1) the amount of immigration, and (2) the number that stay in Havana, for Havana is the port of entry for nearly all immigrants going to other parts of the island. This matter is now being looked up, although it is a very troublesome problem. The first factor at least is determinable and with it a fair estimate of the second. In the meantime I am informed by those in a position to know (trans-Atlantic transportation lines and others) that the immigration was fairly uniform except that one year of high mortality would decidedly diminish the immigration the next spring.^(a)

Comparing the years of the ten normal years we see that 1884 and 1893 were years of heavy mortality, while for 1885, 1886, 1890, and 1891 the rate was low, that for 1885 being very low. With the data in hand no reason can be given for this.

The heavy mortality of 1895 can readily be accounted for by the addition to the civil immigration (not yet stopped) of the families of officers and of the civilian attaches who accompanied the Army. I am informed that the epidemic of this year prevented the immigration of this class of people the next.

The books in my office show that civilian immigration nearly ceased after 1895 and that it was not resumed until in August, 1899. This is doubtless the reason why 1896, 1897, and 1898 were years of small

^a I would estimate the number of immigrants before the war at from 15,000 to 20,000 per annum approximately. Three years during this period which I tabulated gave about 27,500 "passengers arriving by vessels from Spanish ports" per annum, as an average, but this includes both soldiers (estimated at 5,000) and returning Spaniards (a neglectable quantity).

civilian mortality, while 1896 and 1897 pile up the highest military mortality ever known here.

1896, civil, 141; military, 1,579. 1897, civil, 61; military, 1,083.

In 1898 the bulk of susceptibility among the soldiers must have been exhausted, as a garrison of 29,000 to 30,000 gave only 333 deaths. The same is true of civilians, (a) for whom we record only 31, the lowest number in the history of Havana which we have recorded. Among the deaths in November and December are those of a small number (5 I believe) of Americans who had come into Havana believing those months to be free from danger here.

In 1899 the military element was practically eliminated. In the beginning of the occupation the men were lodged in clean quarters (at first many of them were in tents) and kept under very strict discipline and excellent police and sanitary management. There was a case of yellow fever among the marines at the naval station in June and 3 others the last part of July and early August at the same place. They (the marines) were then sent north. A case of yellow fever occurred among the soldiers on the punta in early August, and the command was immediately moved out of town. Most of those quartered in the Maestranza were also moved about the same time. In Cabañas in August (the 8th, I believe) yellow fever developed, apparently from infection inside the buildings, and, the troops not being moved immediately, there was a total of 24 cases and 9 deaths (1 a civilian and 1 dying at Vincennes, Ind.). Fever ceased to spread soon after the command was moved to tents. After August then there was an extremely small number of soldiers in Havana, and, as I have said, they ceased to be a factor in the conveyance of yellow fever and the formation of new foci.

Up to the end of August the civilian mortality for this year was extremely small, and for August and September was decidedly less than the normal before the war, although greater than for the two preceding years. Instead of reaching its maximum, however, in August and September, the October mortality nearly doubled its September figure and December's was only 2 less. It suffered a marked change in January, but extended into March and reached its lowest, 0, in April of this year. May has given us a mortality of only 2.

The run of the fever in 1899 was very like that of 1885, both giving exactly the same mortality, 111, the smallest of any in the normal ten-year series. In both there was the fairest promise, until August in 1885, and September in 1899, and then an unusually rapid increase, dying down, however, more quickly in 1885 than in 1899. In the latter, indeed, we had a real winter epidemic as in 1888 and 1892, and with the exception of these two years the 3 winter months of 1899-1900 give a higher mortality than the corresponding months of any of the seventeen years I have here recorded.

The mortality for this year was low, not so low as 1897 and 1898 but as low as the lowest of the ten normal years. And yet I think Americans were disappointed in the increase of yellow fever in the fall. We hoped it to be much lower than 1885, as low as 1897 and 1898. In other words we expected it to be not only a good year, but a phenomenally good year, and were disappointed that it was not.

^a As near as we can judge from the records of this office, the Spanish immigrant has fever nearly always within the fourth year of his arrival, generally in the second or third. In the examinations we make for "immunity by residence"—that is, of Spaniards who show that they have been here more than ten years, those who claim to have had yellow fever almost always claim to have had it within the first two or three years.

To my mind the cause of the increase of mortality in the fall and winter was exactly the same, reversed, as caused the low mortality in 1897 and 1898—that is, the changed movement of the Spanish immigration, just as a cessation of this movement after 1895 by ceasing to supply susceptible material gave us the low death rate (of yellow fever) of 1896, 1897, 1898, and the early part of 1899. (*a*)

So its recrudescence in the latter part of August by furnishing susceptible material exposed to infection gave us our winter epidemic of 1899 (*b*).

I say “susceptible material exposed to infection,” because the Spanish immigrant is far more exposed to infection than an American in Havana. The latter is usually well-to-do, he is always afraid of yellow fever, and lives in the healthiest part of the city or in the suburbs, or, when he can not do this, lives in the highest room he can get; in short, takes a thousand precautions which the Spaniard neglects or of which he is ignorant. The Spaniard is poor and he does not dread the fever, or, rather, he regards it as inevitable, and I think it fair to say his exposures are many fold more than those of the American. As evidence that the population of the town residing here at the evacuation was to a great extent immune to yellow fever, I will say that only a very few of those who are recorded as having had yellow fever since August 1, 1899, to this date claim to have been on the island more than eight months, and most of them far less, the great majority under four months.

What effect, or rather how much effect, the sanitary work in Havana last summer had in lessening the prevalence of yellow fever among civilians I can not estimate. The cleaning of the streets in the lower part of the city and the removal of garbage, I believe, were of decided value.

The course pursued by the fever, however (I do not mean the mortality per month), is what we would have expected without any sanitary work. Until the Spanish immigration began to be a factor, the amount of the fever is about the same as that of the two previous years, the presence of susceptible Americans tending to balance the decrease in the number of susceptible Spaniards. When this factor began to be felt there was an increase in mortality decidedly greater in ratio (of increase) than normal, but beginning with presumably a smaller number of foci of infection in town than usual (certainly after a much smaller number of cases of yellow fever in town in civilian residences for over three and one-half years) the number of deaths in the fall did not reach the normal of ordinary years. Still the number from September to March inclusive, 102, compares with the normal for this period, 114, very fairly.

One deduction only I will venture to make from these statistics, namely, that the mortality of yellow fever in Havana is less than is generally believed, and that a considerable number, I believe a majority, of the cases are light and not recognized.

a See Havana report in PUBLIC HEALTH REPORTS of August 4, 1899.

b The large number of passengers from Mexican and Venezuelan ports coming in last spring and summer were Cubans returning home and added nothing to the non-immune population, similarly $\frac{1}{10}$ or $\frac{1}{8}$ of the cabin passengers from Spain and the bulk of the steerage were former residents returning to Havana, and fully the same proportion of the immigration from the United States were tourists, returning per next boat. Up to the middle of August there was extremely little immigration of Spaniards who were really newcomers. From that time to December 1, 6,370 (and 10,338 more to June 1) steerage passengers from Spain arrived, nearly all of whom were newcomers to Cuba.

From the hospital records, the mortality is from 30 to 35 per cent. Taking the lesser figure, an average death rate of 210 per annum would give a morbidity of 700 cases per annum.

We can not fix definitely the number of nonimmunes who came as immigrants to Havana and who remain until they have yellow fever. Yet the number who came can scarcely average less than 15,000 per annum. Except the Canary Islanders, a majority—I think a considerable majority—of them remain in the city. What deductions to make for the Canary Islanders in time past is again rather a matter of guess with the data I have on hand than reasonable estimate. Before the war that immigration was larger than it is at present; now they are possibly one-fourth or one-fifth of the whole. It would seem, then, within limits to say that 5,000 per annum were added to the permanent population.

We (the quarantine officers of the United States) have agreed to consider a ten years' residence in Havana as "conveying immunity"—that is, as being "satisfactory evidence" that one has had yellow fever, and our observation here would seem to show that very few Spanish immigrants having yellow fever go four years without it. Except then the very few, if there be any, who are incapable of having yellow fever, it is safe to say that all Spanish immigrants who remain in Havana ten years have yellow fever and nearly all who remain four years have it. We should deduce, then, that 5,000 per annum should have yellow fever.

This is a far different morbidity from any that we can get from hospital statistics, even if I halve my morbidity, which although but a rough estimate, is, I think, within limits, we still have a ratio of mortality very much less than that usually given.

It is also worthy of note that a large number of Spaniards of long residence make no claim to have had any yellow fever, although most of them claim the "fever of acclimatization."

The above remarks have no reference to yellow fever among Cuban children as these probably add not a great deal to the mortality, and none to the *reported mortality of this disease*.

Believing as the writer does that immunity to yellow fever is conferred only by an attack of the disease, and also that the native Havanese is immune to yellow fever when he reaches adult life, he must hold that the average number of children born in Havana per annum gives the average number of cases of yellow fever among them per annum, making deductions for those who die (and move away) before they have the fever.

The following, Table VI, showing the comparative mortality for five years among civilians of yellow fever and tuberculosis in Havana, is interesting. Compared with tuberculosis the influence of yellow fever on the general mortality of the city is insignificant.

Month.	1890.		1891.		1892.		1893.		1894.	
	Yellow fever.	Tuberculosis.	Yellow fever.	Tuberculosis.	Yellow fever.	Tuberculosis.	Yellow fever.	Tuberculosis.	Yellow fever.	Tuberculosis.
January	8	103	5	143	6	170	15	138	5	118
February	9	120	3	126	6	134	7	100	0	101
March	1	150	1	126	0	144	3	143	1	131
April	4	120	4	149	5	118	4	128	4	104
May	9	147	4	143	6	125	4	112	0	111
June	10	177	16	126	10	125	59	108	5	77
July	32	160	13	138	19	101	91	108	11	98
August	28	148	23	147	52	111	82	91	21	123
September	20	124	26	110	58	133	59	94	37	105
October	22	151	23	89	35	118	37	104	29	127
November	16	131	16	114	37	112	29	106	15	120
December	10	130	10	162	33	140	8	99	21	151
Total	169	1,661	144	1,573	267	1,531	398	1,331	139	1,366

Average per annum : Yellow fever, 221.4; tuberculosis, 1,492.4.

Of the total number of deaths from tuberculosis here recorded, 7,462, 6,438 are recorded as "tuberculosis of lungs," giving an average monthly death rate from this disease during these ten years of about 108. It is worthy of note that the mortality of tuberculosis is steadily decreasing during this period of five years.

TABLE VII.

Deaths from tuberculosis of the lungs.

Month.	1896.	1897.	1898.	1899.	1900.	Month.	1896.	1897.	1898.	1899.	1900.
January	184	230	181	75	.....	August	128	177	247	54	.....
February	89	233	166	63	.....	September	139	159	258	47	.....
March	109	253	170	82	.....	October	153	211	257	71	.....
April	157	209	103	68	.....	November	144	219	228	71	.....
May	148	148	255	88	.....	December	177	191	202	79	.....
June	123	147	190	84	.....	Total	1,159	1,928	2,794	1,100	288
July	148	137	232	86	.....					

Table VI, for five years ending with 1894, gives 108 per month as the average death rate for tuberculosis of the lungs with the rate diminishing. Taking this we see that the effect of the war and reconcentration is to cause 2,608 more deaths than normal in the three years from May, 1896, to April, 1899, inclusive. (6,496—3,888—2,608.)

I have not the statistics of this disease from the end of 1894 to May, 1896.

Since April, 1899, the mortality from this disease is greatly diminished, average 72.5 per month.

Obviously during the period of high mortality a great number must have died who would have otherwise lived a few years longer and would now be swelling our bills of mortality. Hence from this fact and because the earlier death of the tubercular patient removed the source of infection to others, which each one must have been, we should expect

that the death rate of this disease would be lowered materially and for a considerable time. It was a most cruel, but effectual method of lessening the presence of tuberculosis in the city.

TABLE VIII.

The mortality from the epidemic of smallpox for 1896 and 1897 is recorded simply to show what that disease can do when the means to prevent its spread, mainly vaccination, are inefficiently applied. There was practically no mortality among the troops.

Month.	1896.	1897.	Month.	1896.	1897.
January.....	12	571	July.....	84	4
February.....	10	581	August.....	88	2
March.....	14	319	September.....	158	.....
April.....	22	93	October.....	140	.....
May.....	23	44	November.....	198	.....
June.....	58	12	December.....	243	.....

Reports from Matanzas, Cardenas, Isabela de Sagua, and Caibarien.

MATANZAS, CUBA, July 5, 1900.

SIR: I have the honor to submit herewith the following sanitary report of the quarantine district under my command, for the week ended June 30, 1900:

Matanzas.—Nineteen deaths occurred in the city of Matanzas during the period covered by this report, showing a mortality of 21.89 per 1,000. The principal causes of deaths were as follows: Tuberculosis, 6; heart disease, 2; infectious fever, 1; malaria, 1; enteritis, 1; meningitis, 1; cancer, 1; rickets, 1; tetanus, 1; other causes, 4. The following cases of infectious or contagious character were reported: Diphtheria, 2; typhoid fever, 1. Ten vessels arrived during the week; 5 of these were inspected and passed and 5 passed without inspection. Eleven bills of health were issued to foreign vessels. The British schooner *Boniform* and the German steamship *Pionier*, bound for Mobile, Ala., were disinfected at this port. One health certificate was issued to a person leaving the island via Havana, Cuba. Fifty-four bundles of clothes and bedding were disinfected; 17 of these belonged to the schooner *Boniform* and 37 to the steamship *Pionier*.

Information received to-day from Santa Clara shows 12 cases of yellow fever at present, 8 of which are convalescent. It is hoped that the outbreak is about over.

Cardenas.—Acting Asst. Surg. Enrique Saez reports that 15 deaths occurred in Cardenas during the week. The principal causes of deaths were as follows: Tuberculosis, 4; enteritis, 1; infectious fever, 1; bronchitis, 1; pneumonia, 1; cerebral hemorrhage, 1; atresia, 1; other causes, 5. No cases of infectious or contagious character were reported. The death rate during the week was 31.51 per 1,000. Sixteen vessels arrived during the week; 9 of these were foreign vessels and 7 coasting vessels. Nine bills of health were issued to foreign vessels.

Isabela de Sagua.—Acting Asst. Surg. Pedro Garcia Riera reports that the death rate during the week was 32.86 per 1,000. No vessel arrived during the week. Six bills of health were issued to foreign vessels and 7 certificates of inspection to coasting vessels.

Caibarien.—Acting Asst. Surg. Bernardo Escobar reports that 4 deaths occurred in Caibarien during the week as follows: Tuberculosis,